

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF BACHELOR OF SCIENCE IN BIOMEDICAL
SCIENCE AND TECHNOLOGY**

BMET 442: RECOMBINANT DNA TECHNIQUES

STREAMS: BMET

TIME:2 HOURS

DAY/DATE: TUESDAY 17/12/2024

11.30 A.M. –1.30 P.M.

INSTRUCTIONS: *Answer question ONE and any other TWO questions*

QUESTION ONE (30 MARKS)

- a) Outline the basic steps in DNA extraction (8 marks)
- b) Explain how DNA micro arrays can be used to screen patient's cells for a cancer prognosis. (5 marks)
- c) Enumerate the various ways of bacterial cell transformation used in recombinant DNA technology. (6 marks)
- d) Explain the use of spectrophotometers in checking the quality of DNA. (4 Marks)
- e) List any four advantages of Next Generation Sequencing (NGS). (4 marks)
- f) Explain the use of recombinant DNA technology in gene therapy. (3 marks)

QUESTION TWO (20 MARKS)

- a) Explain the shotgun sequencing technique used in mapping human genome. (10 marks)
- b) Describe in details the steps in recombinant DNA technology. (10 marks)

QUESTION THREE (20 MARKS)

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- a) Describe the use of Real Time PCR (RTPCR) in detection of COVID-19 virus and its variants. (10 marks)
- b) Explain the application of the following enzyme in recombinant DNA technology. (10 marks)
- (i) DNA ligase
 - (ii) Alkaline phosphatase
 - (iii) Polynucleotide kinase
 - (iv) DNA methylase
 - (v) Terminal deoxynucleotidyl transferase

QUESTION FOUR (20 MARKS)

- a) Explain the recombinant DNA steps involved in the production of insulin in *E. coli* cells. (10 marks)
- b) Illustrate the southern blotting technique. (10 marks)
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